Shun-ichi UDAGAWA* & Yosio KOBAYASI**: Coprophilous fungi of Mexican volcano Popocatepetl

宇田川俊一*・小林義雄**: ポポカテペトル山糞生菌類

During the mycological excursion following the Second International Mycological Congress in 1977, Kobayasi collected a few samples of animal dungs at 3200-4000 m in altitudes of Mt. Popocatepetl in Mexico. These samples were then forwarded to the National Institute of Hygienic Sciences, Tokyo, for further examination of coprophilous Ascomycetes. In this short communication we report some Pyrenomycetes occurring on the dungs in a moist chamber. The specimens studied are all kept in the Mycological Herbarium, National Institute of Hygienic Sciences, Tokyo.

Podosordaria straminea Udagawa, sp. nov. (Figs. 1, 3, 4)

Stromata globosa, circa 2 mm diam et 1.2 mm alta, straminea, sessilia, semiimersa, incrassatissima, cum pagina scabrella, plura perithecia continentia, ectostroma flavo-brunnea vel valde olivaceo-brunnea, 20-40 μm crassa, 'textura epidermoidea' vel aliquantum 'textura globulosa', e cellulis incrassatis, brunneis, 3-8 μm diam composita; stromatis cellulae hyalinae vel cremeae, incrassatae, prosenchymatosae, elongatae, 30-130×4-12(-15) μm, catenulatae. Perithecia in stromatibus immersa, ovata vel subpyriformia, plerumque 550-600×350-425 μm; perithecii collum breve, tholiforme vel brevi-cylindraceum, 95-120×135-200 μm, distinctum, atribrunneum vel nigrum, leve, plus minusve supra superficiem stromatis protrudens; ostiolum distinctum, circa 65-80 μm diam. Peridium flavo-brunneum, subcoriaceum, 20-32 μm crassum; stratum exterius pseudoparenchymatum, 'textura intricata', e cellulis filamentosis, elongatis, incrassatis, brunneis, 2.5-3 μm diam compositum; stratum interius e cellulis hyalinis, plus minusve angularibus, 5-10×2-3 μm compositum. Asci octospori, cylindracei vel pyriformes, (140-)170-180×26-30(-34) μm, superne rotundati vel aliquantum truncati, basin versus in stipitem 12-18 μm longum abruptius contracti; apparatus apicalis iodo colorem caeruleum accipiens,

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* Laboratory of Mycology, National Institute of Hygienic Sciences, Kamiyoga 1-chome, Setagaya-ku, Tokyo 158. 国立衛生試験所.

** National Science Museum, Tokyo. 国立科学博物館.

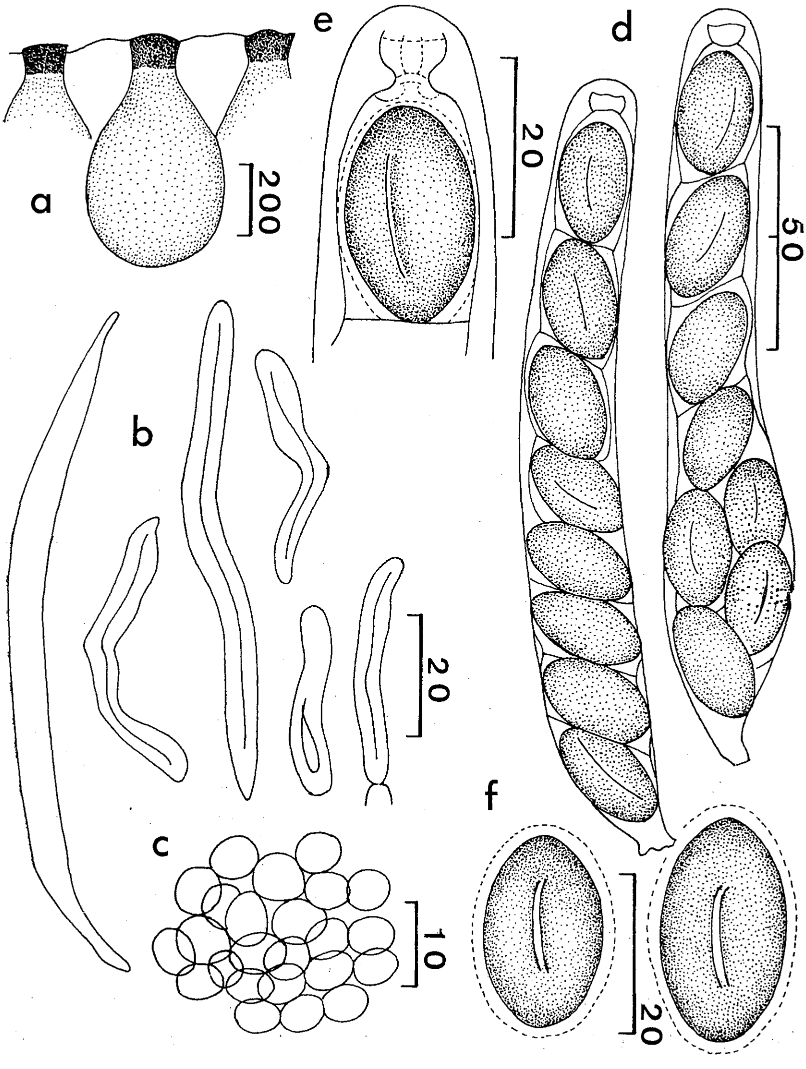


Fig. 1. *Podosordaria straminea.* a. A part of stroma showing perithecium in side view. b. Stromatic cells drawn in sectional view. c. Ectostromatic cells shown in surface view. d. Asci. e. Apical apparatus. f. Ascospores. (All measurements are μm.)

indistinctus, cylindraceus, (4-)6-8×4-6 μm, 1-2 annulus inconspicuus praeditus. Paraphyses numerosae, hyalinae, cylindraceae, 2.5-5 μm latae, septatae, saepe guttulatae. Ascosporae asci apicem versus oblique uniseriales, asci basin versus saepe biseriales, unicellulares, ellipsoideae, 24-27×15-17 μm, in apicibus late rotundatae vel parum acuminatae, interdum 'de Bary bubble' praeditae, flavo-brunneae vel olivaceo-brunneae, postremo atribrunneae vel fere nigrae et opacae; fissura germinalis centralis, 12-14 μm longa; vagina gelatinosa hyalina, usque 5 μm lata.

Holotypus: In vaccarum fimo lectus est, infra 3800 m alt., in monte Popocatepetl, reipublicae Mexicanae, 8-9 Sept. 1977, col. Y. Kobayasi, No. 2821. The holotype is in the Mycological Herbarium, National Institute of Hygienic Sciences, Tokyo.

Etymology: *stramineus*=straw-colored, referring to the color of the ectostroma.

So far, 11 species have been described in *Podosordaria* Ellis & Holw. (Krug and Cain, 1974; Furuya and Udagawa, 1976). Of these, only *P. crinita* Krug & Cain and *P. mexicana* Ellis & Holw. are somewhat similar to this species in their ascospore dimensions. From *P. crinita* it is easily distinguished by the glabrous, spherical and multiperitheciate stroma, the longer asci, and the slightly larger ascospores. *Podosordaria mexicana* may be separated by the dark brown stalked stroma, the narrower asci, the longer ascospores, and the germ slit length.

Hypocopra cataphracta Krug & Cain, Can. J. Bot. **52**: 818. 1974.

(Figs. 2, 5, 6)

Stromata clustered, small, dark brown to nearly black, superficial, convex, shield-shaped, 40-50 μm thick, with each containing from one to several perithecia; stromatic cells pseudoparenchymatous, dark brown, thick-walled, angular, 5-8×4-7 μm. Perithecia immersed, dark brown, base subglobose, 650-750×400-550 μm (including neck); neck short, dome-shaped, black, smooth, rather indistinct, with dark thick-walled cells, extending above the surface of the stroma, ostiolate. Peridium typically membranaceous, thin, about 15-20 μm thick, textura epidermoidea to textura angularis; outer layer consisting of angular, brown, thick-walled, isodiametric cells measuring 5-18×4-14 μm; inner layer consisting of hyaline cells. Asci 8-spored, cylindrical, (160-)185-240×20-24(-28) μm, rounded but somewhat narrowed at the apices,

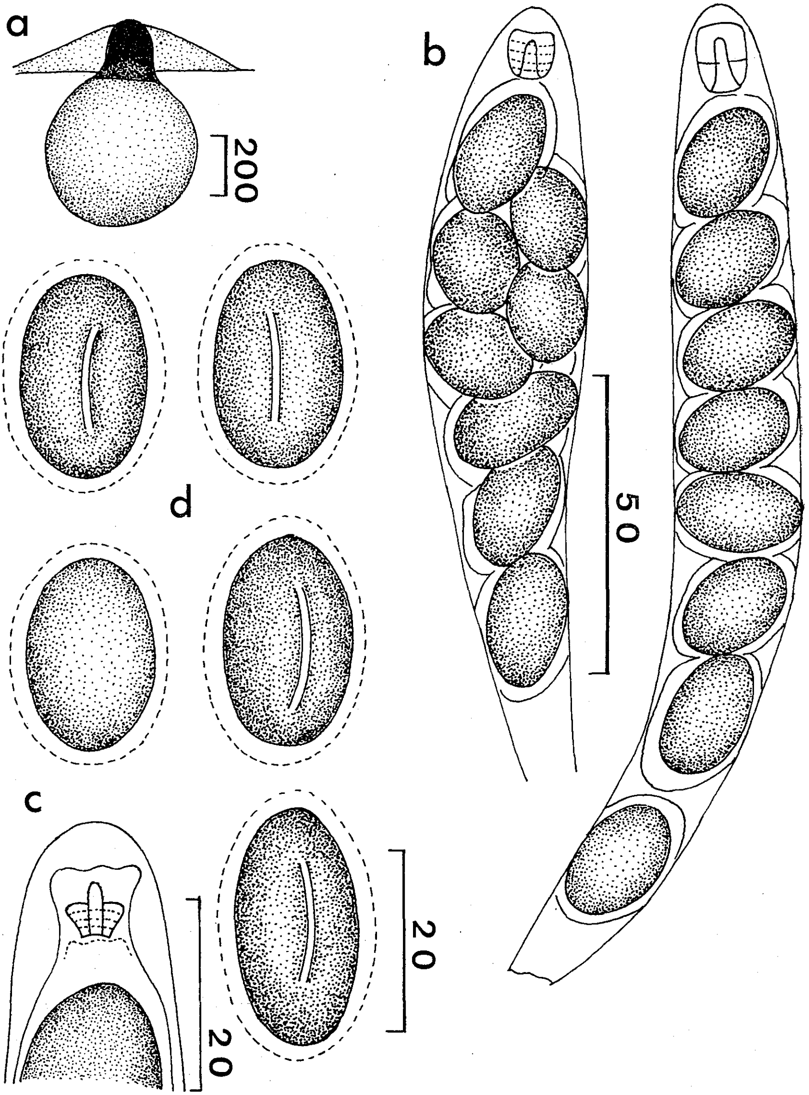


Fig. 2. *Hypocopra cataphracta*. a. Perithecium and associated clypeate stroma. b. Asci. c. Apical apparatus. d. Ascospores. (All measurements are μm.)

tapering in a short stipe up to 40-55 μm long; apical apparatus I+(dark blue), indistinct, cylindrical, with a few very inconspicuous rings, 8-10×7-9 μm. Paraphyses very abundant, tubular, 3.5-5.5 μm broad, hyaline, septate. Ascospores one-celled, obliquely uniseriate, at first hyaline to yellowish brown, then becoming dark brown, opaque, ellipsoidal, (20-)21-26(-28)×12-15 μm, narrowed towards the ends, mostly rounded at both ends but sometimes slightly apiculate; germ slit central, 12-14 μm long, about 1 μm thick; gelatinous sheath hyaline, about 5 μm broad.

Habitat: on hare dung, 4000 m in altitude, Mt. Popocatepetl, Mexico, 8-9 Sept. 1977, col. Y. Kobayasi, No. 2820.

Hypocopra cataphracta, which has been known only from the type locality (on horse dung, South Dakota, U. S. A.), is distinguishable from *H. equorum* (Fuckel) Winter by its more spreading stroma without a hyphal mat, its unchangeable reaction of the apical apparatus of the ascus, and its longer and broader ascospores. Our specimen differs slightly from the original description in that the asci and the apical appratus are broader.

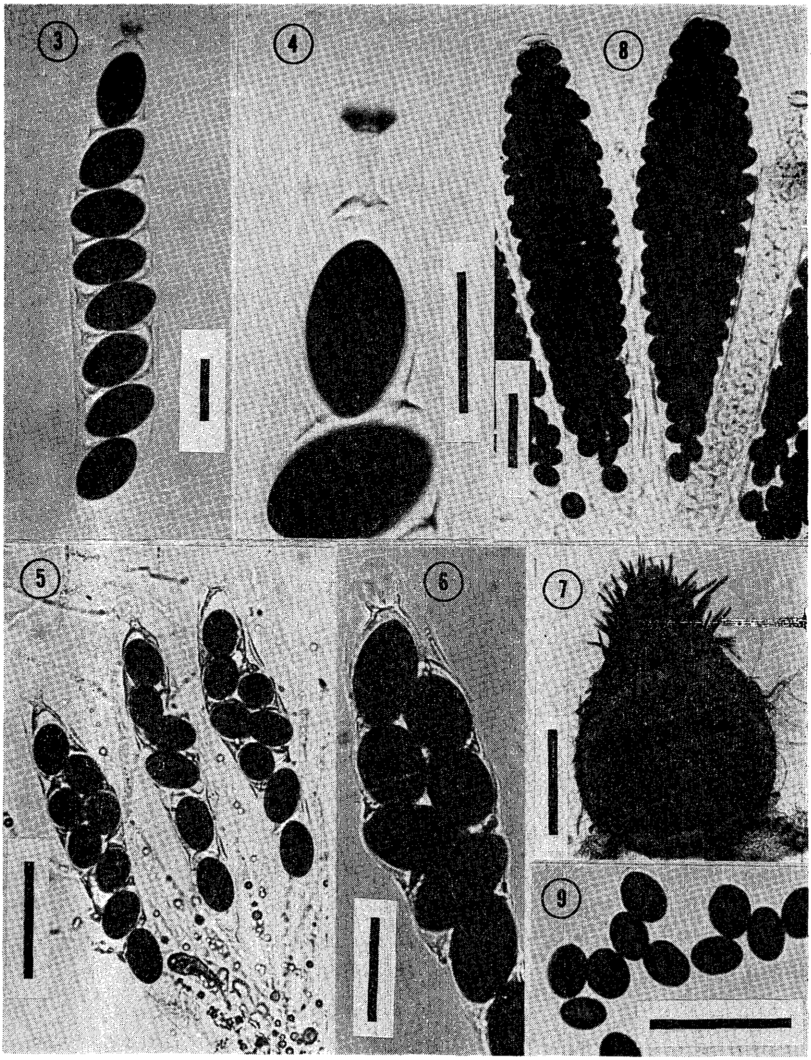
Coniochaeta hansenii (Oudem.) Cain, Univ. Toronto Stud., Biol. Ser. 38: 63. 1934. (Figs. 7-9)

Sordaria hansenii Oudem., Hedwigia 21: 123. 1882.

Perithecia light brown, pyriform, 280-345×200-250 μm, hairy; neck black, conical, 80-105×95-145 μm, covered with straight, dark brown or black, continuous, setae-like hairs measuring up to 95 μm long and 3-5.5 μm wide at the base. Peridium thin, brown, membranaceous. Asci 128-spored (sometimes 64-spored), clavate, 145-160×24-32 μm, with an apical ring, tapering below into a short stipe; paraphyses hyaline, filiform above, 3-3.5 μm in diam, swollen below up to 6 μm in diam. Ascospores multiseriate, dark brown, somewhat discoid, broadly ellipsoidal to ovate in face view, 6-8×5-6×4.5-5 μm; germ slit lateral, extending nearly the entire length of the spore; gelatinous sheath hyaline, narrow. Conidial structures not observed.

Habitat: on hare dung, 3800 and 4000 m in altitudes, Mt. Popocatepetl, Mexico, 8-9 Sept. 1977, col. Y. Kobayasi, No. 2819.

This species has been recorded rather infrequently from herviores' dungs (deer, hare, rabbit, etc.) in many parts of the world. The above description closely agrees with that of Cain (1934).



Figs. 3, 4. *Podosordaria straminea*. 3. Ascus (scale: 20 μm). 4. Apical apparatus (stained with Melzer's reagent) (20μm). Figs. 5, 6. *Hypocopra cataphracta*. 5. Asci (50 μm). 6. Ascus showing apical apparatus (20 μm). Figs. 7-9. *Coniochaeta hansenii*. 7. Perithecium (100 μm). 8. Asci (20 μm). 9. Ascospores (20 μm).

Coniochaeta ligniaria (Grev.) Massee

Habitat: on hare dung, 3800 m in alt., Mt. Popocatepetl, Mexico, 8-9 Sept. 1977, col. Y. Kobayasi, 77-D-8-1.

Delitschia patagonica Speg.

Habitat: on hare dung, 3800 m in alt., Mt. Popocatepetl, Mexico, 8-9 Sept. 1977, col. Y. Kobayasi, 77-D-7-1.

Podospora tetraspora (Winter) Cain

Habitat: on hare dung, 3800 m in alt., Mt. Popocatepetl, Mexico, 8-9 Sept. 1977, col. Y. Kobayasi, 77-D-7-2.

Sporormiella intermedia (Auersw.) Ahmed & Cain

Habitat: on hare dung, 3800 m and 4000 m in alt., Mt. Popocatepetl, Mexico, 8-9 Sept. 1977, col. Y. Kobayasi, 77-D-7-3 and 77-D-6.

References

Cain, R.F. 1934. Univ. Toronto Stud., Biol. Ser. **38**: 1-126. Furuya, K. & S. Udagawa. 1976. Trans. mycol. Soc. Japan **17**: 248-261. Krug, J.C. & R.F. Cain. 1974. Can. J. Bot. **52**: 589-605 and 809-843.

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メキシコの高山 Popocatepetl において採集された動物糞の試料数点から以下の糞生子のう菌類がえられた。いずれも核菌類に属する。

Podosordaria straminea（新種） 子のう子座は球形，麦わら色，構成細胞は細長く連鎖し，数個の子のう殻を内蔵する。子のうは8胞子，円筒形～洋なし形，その先端構造はメルツァー試薬で青く染まる。子のう胞子は楕円形，24-27×15-17 μm，暗褐色～黒色，中央に長さ 12-14 μm の発芽スリットがみられる。本属の既知11種のいずれとも上記の性質が一致しないため新種として記載した。

標高 3800 m 下の地点で採集された兎糞から発見された。

Hypocopra cataphracta 1974年，U.S.A. の South Dakota で採集された馬糞から報告されている。その後の記録なく，第二の発見と思われる。暗褐色～黒色，楕形の子のう子座中に数個の子のう殻を内蔵する。子のう先端構造はメルツァー試薬で青く染まり，変色はみられない。子のう胞子の大きさは広く分布する *H. equorum* (Fuckel) Winter よりも長く，幅広い。

Coniochaeta hansenii 128胞子（ときに64胞子）の子のうを形成する種として知られている。世界的に広く分布し，草食動物の糞から発見されているが，*Coniochaeta*としては比較的まれな種である。

そのほか，*Coniochaeta ligniaria*, *Delitschia patagonica*, *Podospora tetraspora*, *Sporormiella intermedia* がえられた。

○**Materials for the distribution of lichens in Japan** (4) 地衣類分布資料 (4)

○**Lecidea** (sect. Toniniopsis Sato) **fujikawae** Sato. The present species is characterized by the bullate or inflated thallus and the well developed upper cortex, which both are quite unusual in the genus *Lecidea*. It has been recorded from only two localities: Todai, Prov. Shinano, the type locality (Sato, Journ. Jap. Bot. 12: 47-49, 1936) and Mt. Ishidate, Prov. Tosa (Yoshimura, Misc. Bryol. Lichenol. 2: 5, 1960). The author recently found this species growing on an escarpment of calcareous rocks on Mt. Kano, Tano-gun, Gunma Prefecture. In TNS, in addition, two other specimens are preserved. These specimens were also collected on calcareous rocks. Even though Sato (1936) reported that the type specimen was collected on non-calcareous rocks, therefore, this species seems to be one of calcareous species as suggested by Yoshimura (1960).

Specimens examined. Prov. Rikuchu: Valley behind Kamitaki-bashi bridge, Shimo-iwaizumi, Iwaizumi, Shimo-hei-gun, elevation about 200 m, S. Kurokawa 67203 (TNS). Prov. Shinano: Mt. Shiraiwa-dake, Kami-ina-gun, elevation about 1900 m, K. Saito (TNS). Gunma Pref. (Prov. Kozuke): On summit of Mt. Kano, Tano-gun, elevation 1106 m, K. Yoshida 3762 & 3763 (TNS). (Kozo Yoshida)

昨年 (1978年) 著者は群馬県多野郡中里村内の叶山 (標高 1106 m) の頂上にて，石灰岩上に生育していた本種 (フジカワゴケ) を採集した。タイプ標本は信州，上伊那郡，戸台の非石灰岩質の岩上で採集したと報告されているが，陸中，下岩泉産，信州，白岩岳産，そして土佐，石立山産の何れもが石灰岩生である。したがって本種は石灰岩生か，あるいは石灰岩の影響を受ける地域に分布するものと考えられる。 (吉田考造)

□H. E. Street (ed.): **Essays in plant taxonomy**, 304 pp., Academic Press, 1978, ¥6,700. 本書は Flora Europaea で有名な T. G. Tutin の70才を記念して編集されたもので，Tutin の業積のリストなども紹介されている。寄稿者はほとんどがイギリスの大学ならびに研究機関の人で，14篇の論文が寄せられている。D. H. Velentine の "Ecological criteria in plant taxonomy", D. M. Moore の "The chromosome and plant taxonomy", P. W. Richards の "The taxonomy of Bryophytes" など，分類学関係の主要な問題点に関する論議を主としたものが多い。現在の分類学の一面をみるのに都合のよいエッセイ集である。 (井上 浩)